claim 25

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TITLE: MEMORY CHECK SYSTEM

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APPL-DATE: August 19, 1991

INT-CL (IPC): G06F012/16

ABSTRACT:

PURPOSE: To read reliable data by checking the authenticity of data read out from a nonvolatile memory.

CONSTITUTION: An information processing system reading and writing data in a non-volatile memory 2 is provided with a write step writing the same data on the different addresses of the nonvolatile memory 2 and a read step successively reading data written in the different addresses of the nonvolatile memory 2 in this write step. It is also provided with a data check step comparing a plurality of data successively read out by the read step each other and outputting one of them as read data. Thus, the

authenticity of data read
out from the nonvolatile memory 2 is checked, resulting in
reading reliable
data.

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : **TOSHIBA CORP**

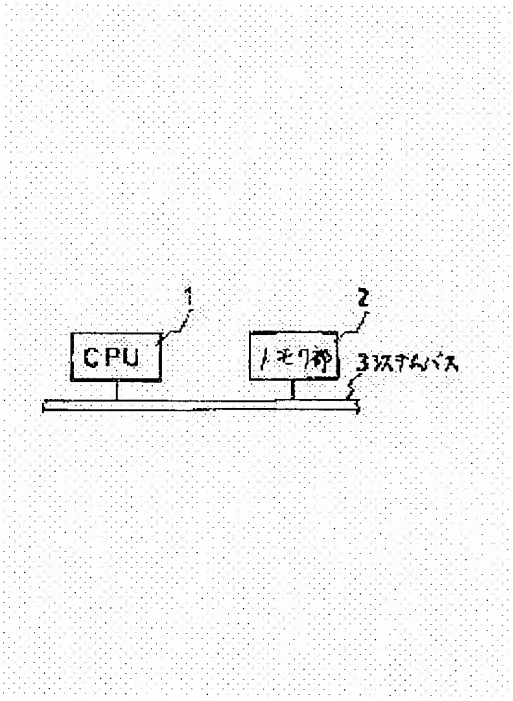
(72)Inventor : **TESHIGAWARA SAKIKO**

(54) MEMORY CHECK SYSTEM

(57)Abstract:

PURPOSE: To read reliable data by checking the authenticity of data read out from a nonvolatile memory.

CONSTITUTION: An information processing system reading and writing data in a non-volatile memory 2 is provided with a write step writing the same data on the different addresses of the nonvolatile memory 2 and a read step successively reading data written in the different addresses of the nonvolatile memory 2 in this write step. It is also provided with a data check step comparing a plurality of data successively read out by the read step each other and outputting one of them as read data. Thus, the authenticity of data read out from the nonvolatile memory 2 is checked, resulting in reading reliable data.



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JAPANESE [JP,05-046494,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS

[Claim(s)]
[Claim 1] In the information processing system which write data to nonvolatile memory The write-in step which writes the same data in the address with which the plurality of said nonvolatile memory differs, The read-out step which reads the data written in the address with which the plurality of said nonvolatile memory differs at this write-in step one by one, The memory check method characterized by coming to provide the data check step which reads one of them as compared with mutual, and outputs as data two or more data read one by one by this read-out step.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the memory check method at the time of reading the data currently written in nonvolatile memory.
[0002]
[Description of the Prior Art] From the former, data are put into ROM or RAM with information processors, such as a computer system which has a program in ROM, in many cases. However, in having put data into ROM, could not change data, but by RAM, having un-arranged [that the data put in on said RAM will disappear], when the power source of a system was dropped, although modification of data was completed freely. then -- even if it drops the power source of a system -- data -- it is necessary to hold -- in addition -- and when the data must be changed, making the memory (E2 PROM etc.) of a non-volatile memorize data is performed.
[0003] However, if there are some which must drop a power source on emergency unconditionally depending on a system and a power source is dropped on the midst which is writing data in said nonvolatile memory Depending on timing, writing is not performed at all. Old data remain or Or the written-in data completely become random and it becomes what any guarantee does not have in the credibility of the data which said nonvolatile memory holds. When a power source was supplied to a system next time and the data of said nonvolatile memory were read, the dependability of the data had the fault that a problem arose.
[0004]
[Problem(s) to be Solved by the Invention] When the power source of a system was suddenly dropped at the time of writing, data are written in and read to nonvolatile memory like the above and said data were read [the data written in said memory became unfixed and] from said nonvolatile memory to next time, any guarantee cannot be found in the credibility of the data, and there was a fault that dependability was missing.
[0005] Then, this invention removes the above-mentioned fault, checks truth of the data read from nonvolatile memory, and it aims at offering the memory check method which can read reliable data.
[0006]
[Means for Solving the Problem] In the information processing system with which reading and this invention write data to nonvolatile memory The write-in step which writes the same data in the address with which the plurality of said nonvolatile memory differs, The read-out step which reads the data written in the address with which the plurality of said nonvolatile memory differs at this write-in step one by one, It has the configuration which comes to provide the data check step which reads one of them as compared with mutual, and outputs as data two or more data read one by one by this read-out step.
[0007]
[Function] In the memory check method of this invention, a write-in step writes the same data in the address with which the plurality of said nonvolatile memory differs. A read-out step reads the data written in the address with which the plurality of said nonvolatile memory differs at this write-in step

one by one. By this read-out step, as compared with mutual, a data check step reads one of them, and outputs as data two or more data read one by one.
[0008]
[Example] Hereafter, one example of this invention is explained with reference to a drawing. Drawing 1 is the block diagram having shown one example of the information processing system which applied the memory check method of this invention. CPU to which 1 performs writing / read-out of the data to the memory section 2, memory check processing, etc., the memory section by which, as for 2, various data are written, and 3 are system buses.
[0009] Drawing 2 is the memory map in which the example of a detail configuration of the memory section shown in drawing 1 was shown. From the 0th street to 7FFF addresses of this memory section consist of RAM, and the EFFF address is constituted for from F000 street to the FFFF address from the 8000th street by nonvolatile memory by ROM. Furthermore, in said nonvolatile memory, the same data shall be written, for example in each address of F000, F001, and F002. That is, data DT 1 will become it with DT1=DT2=DT3, supposing data DT 2 were written in F001 street and data DT 3 are written in F000 street at F002 street.
[0010] Next, actuation of this example is explained. CPU1 performs actuation according to the flow chart shown in drawing 3 , when writing data in the nonvolatile memory of the memory section 2 through a system bus 3. First, the data DT1, DT2, and DT3 which have the same value are made from step 301, to F001 street which showed DT2 to drawing 2 at step 303, it writes in F002 street which showed DT3 to drawing 2 at step 304, and processing is ended at F000 street which showed DT1 to drawing 2 at step 302.
[0011] Next, in case CPU1 reads data from nonvolatile memory 2 through a system bus 3, actuation according to the flow chart shown in drawing 4 is performed. First, CPU1 reads DT1 from nonvolatile memory 2 at step 401, then, reads DT2 from nonvolatile memory 2 at step 402, and reads DT3 from nonvolatile memory 2 at step 403 further. Then, it progresses to step 404, and it judges whether it is DT1=DT2, it comes out so and, in a certain case, progresses to step 410, and CPU1 progresses to step 405, when that is not right. At step 405, it judges whether it is DT1=DT3 or there is nothing, it comes out so and, in a certain case, progresses to step 408, and when that is not right, it progresses to step 406. At step 406, ****** which is DT2=DT3 is judged, it comes out so and, in a certain case, progresses to step 409, and when that is not right, it progresses to step 407. At step 408, DT1 is adopted as right data DT, at step 409, DT2 is adopted as right data DT, by step 410, CPU1 adopts DT1 as right data DT at step 407, and processing is ended [DT1 is adopted as right data DT, and].
[0012] according to this example, after writing the same data in 3 addresses with which the nonvolatile memory of the memory section 2 differs and reading said same data from said 3 different addresses one by one at the time of read-out, the credibility of the read data can be guaranteed with high dependability by considering that it is right read-out data which take the same value in [of at least two pieces] these data that carried out reading appearance. Therefore, since the contents of data of nonvolatile memory are checked as mentioned above even if the power source of a system falls while writing data in said nonvolatile memory, the dependability of the data which possibility that the read data are a right thing was high, and read from said nonvolatile memory can be raised. In addition, although data DT 1 are adopted as right data in the above-mentioned example when taking the value from which each of three data read from nonvolatile memory differs, it reports that the memory content became amusing to an operator in such a case, and you may make it make an operator do the check of right data.
[0013]
[Effect of the Invention] As described above, according to the memory check method of this invention, truth of the data read from nonvolatile memory can be checked, and reliable data can be read.

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TECHNICAL FIELD

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PRIOR ART

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM

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MEANS

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OPERATION

[Function] In the memory check method of this invention, a write-in step writes the same data in the address with which the plurality of said nonvolatile memory differs. A read-out step reads the data written in the address with which the plurality of said nonvolatile memory differs at this write-in step one by one. By this read-out step, as compared with mutual, a data check step reads one of them, and outputs as data two or more data read one by one.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The block diagram having shown an example of the information processing system which applied the memory check method of this invention.
[Drawing 2] Drawing showing the memory map of the memory section shown in drawing 1 .
[Drawing 3] The flow chart which showed the write-in method of the data to the nonvolatile memory of CPU shown in drawing 1 .
[Drawing 4] The flow chart which showed the read-out method of the data to the nonvolatile memory of CPU shown in drawing 1 .
[Description of Notations]
1 -- CPU
2 -- Memory section
3 -- System bus

[Translation done.]

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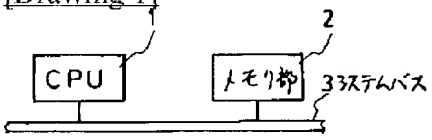
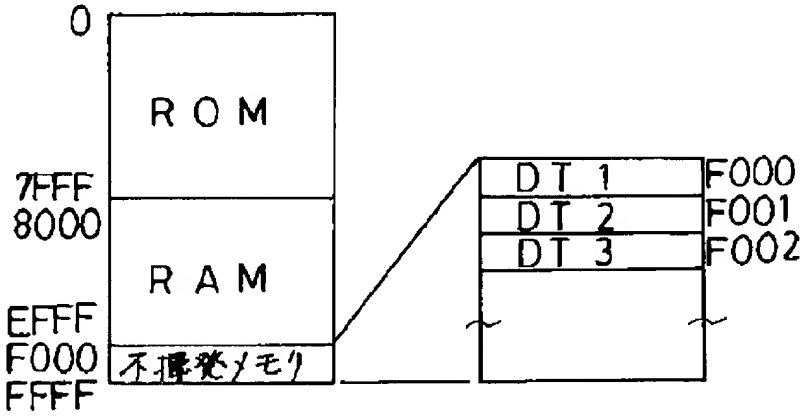
DRAWINGS

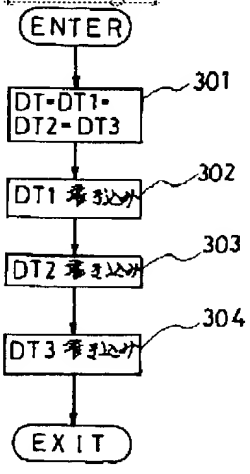
[Drawing 1]



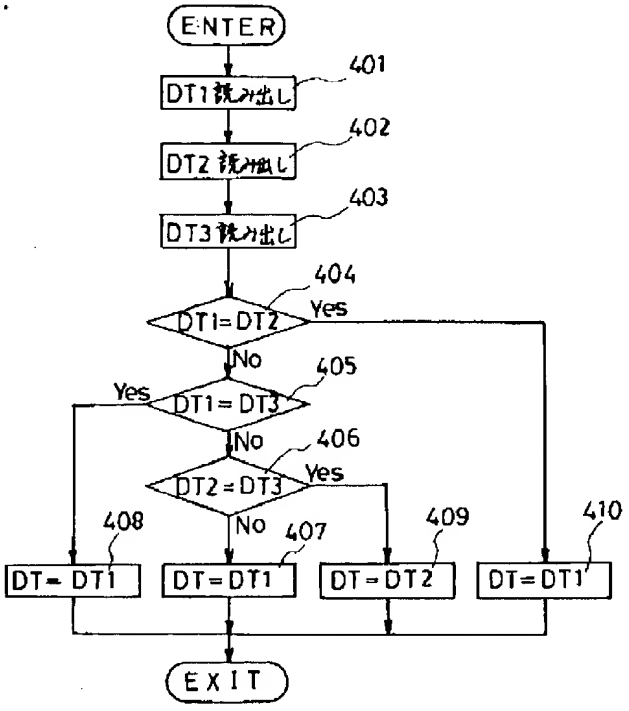
[Drawing 2]



[Drawing 3]



[Drawing 4]



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